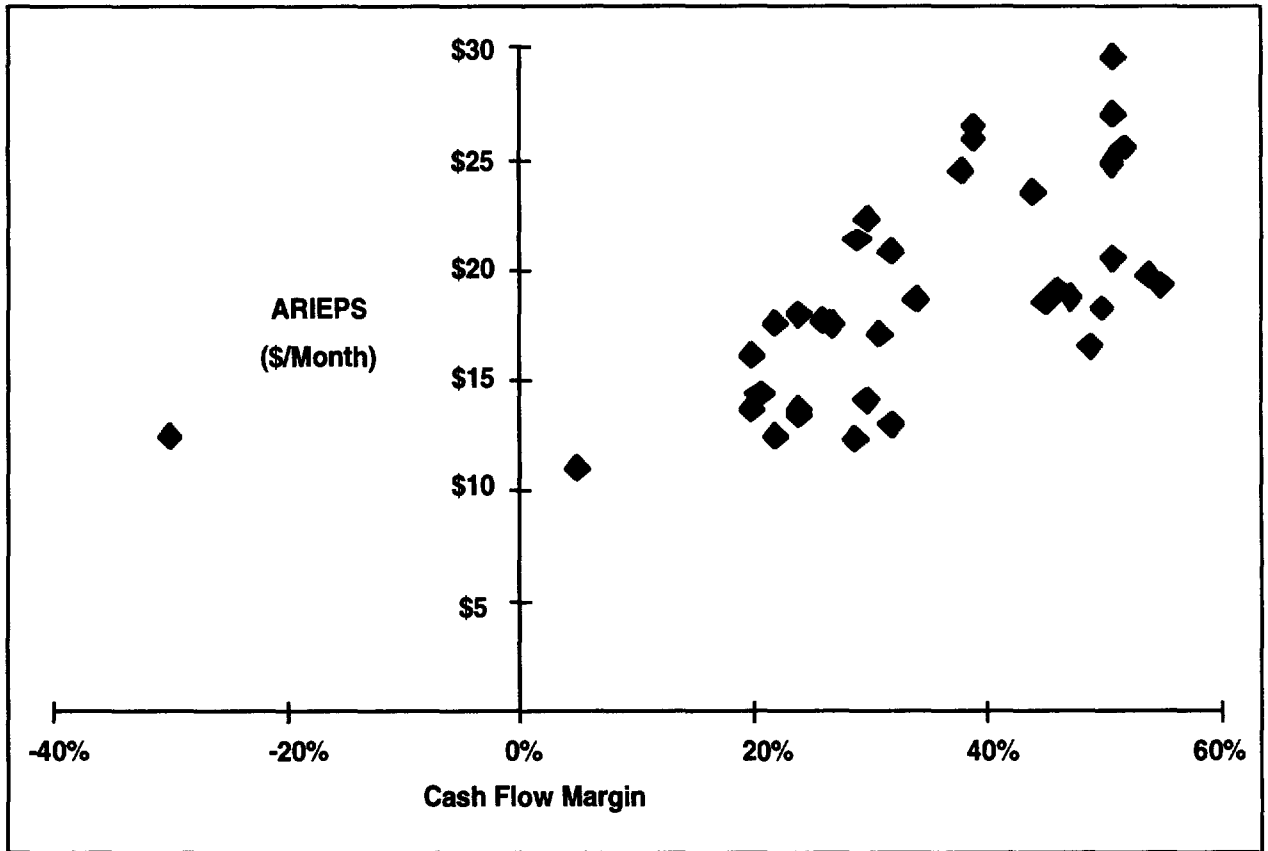


Chart IV-2 Relationship Between ARIEPS and Cash Flow Margin



V. Other Issues Concerning FCC Competitive Sample

Our survey raises additional questions concerning certain franchises in the competitive sample.

A. Erroneous Designation as Competitive

Two franchises (MD0009-W, MD0009-D) are erroneously classified as competitive, with 100 percent OVL, due to an error by the cable operator in consultation with FCC staff in completing the FCC's questionnaire. In fact, the management of these franchises now report no overbuild competition.

B. Instability in Overbuild Markets

Cable industry participants often observe that U.S. cable overbuilds tend to be temporary, usually ending in merger of the competitors, market exit by one of them, or acquisition of both by a third party.

Such instability is evident since the FCC's 9/1992 survey date in several markets served by competitive franchises:

- **MN0049 and MN0802**
Both competitors in the same market were acquired by a third entity, the local telephone cooperative, in 1993. Price per subscriber is reported at \$930 (MN0049) and \$987 (MN0802), substantially lower than amounts currently paid for cable subscribers in non-competitive markets
- **FL0679**
Competitors merged in 10/92, just after the date of the FCC survey (9/92).
- **KY0867**
Sold in 5/1994 for \$377 per subscriber, substantially lower than prices being paid for systems in non-overbuild markets.

Each of these events suggests that these franchises were not providing adequate financial performance. For three of these four franchises, financial data are lacking that would directly show their viability; the one franchise for which financial data are available reports a cash flow margin under 30 percent.

C. Evidence of Financial Non-Viability

Information obtained in the course of our survey also reveals special circumstances that call into question the inclusion of other franchises in a sample used to establish rate benchmarks for the cable industry:

- **MN0891**
Construction was financed by a municipal General Obligation bond. Repayment in 1993 includes \$46,000 from the City general fund, plus \$20,000 from the cable operator.
- **MN0839**
Debt capital was borrowed from the municipal utility. Repayment without interest is being made from cable cash flow if and when available.
- **MN0182**
Competitive losses result in a current base of 28 subscribers. Operated by manager as only one among 65 franchises.
- **MN0115**
Franchise is neglected and poorly maintained. Down to 58 subscribers. Owner is absent. Contractual dispute blocks sale.
- **AR0576**
Without "other non-operating income," franchise lacks cash flow to cover "interest and miscellaneous" non-operating expenses. Competitor reports that property tax has been levied to assist repayment of General Obligation bond that financed system.
- **GA0757**
Major shareholder is covering debt repayment with personal loans to system, which generates inadequate income to repay bank
- **OR0146**
Most subscribers lost to competitor; now down to 75. No major upgrade for 15 years, nor rebuild for 26 years
- **XX0022**
No return for owners. Cash sufficient only for \$300/week salary of partner/manager.
- **AR0026**
Cable operator states cash flow margin is zero, due to need to compete with municipally-owned system.

1 Cable Financial Returns: Competitive Systems

2

3 Financial Assumptions

4 Interest Rate 8.50% FCC Rpt& Order, Docket 93-215, 30Mar94, p102

5 Debt Leverage on Capital Investment 50% FCC Rpt& Order, Docket 93-215, 30Mar94, p106-108

6 Debt Repayment

7 Starting Year 3

8 Term 9

9 Overall Rate of Return (AfterTax) 11.25% FCC Rpt& Order, Docket 93-215, 30Mar94, p108

10 After Tax Return to Equity 14% Derived as in FCC Rpt& Order, Docket 93-215, 30Mar94, p108: Eq.Ret=(Avg Return-(%Debt*Debt Cost))/%Equity

11 Plus Allowed Return for Tax @ Rate: 34% 7.21% Gross up as in FCC Rpt& Order, Docket 93-215, 30Mar94, p83. Formula: Gross up = ((Tax rate/(1-Tax Rate))* Rate of return

12 Equity Rate of Return (PreTax) 21.21%

13 Terminal Multiple of Cash Flow 9 CF Multiple = 1/Rate of Return

14

15

16

17 Cable Franchise

ADL Code

18 Initial Capital Expenditure per Subscriber \$650 QQ146

19 Annual Capital per Subscriber \$0 Assumed

20 Revenue per Subscriber \$306 QQ146

21 Expenses per Subscriber \$222 QQ146

22 Cash Flow per Subscriber \$84 QQ146

23 Cash Flow growth assumption (per Yr) 1% Real growth - assumed

24

25 Financial Performance

Year-->

26 Annual cash flows \$84 \$85 \$86 \$87 \$87 \$88 \$89 \$90 \$91 \$92

27 Plus Terminal Cash \$84 \$85 \$86 \$87 \$87 \$88 \$89 \$90 \$91 \$908

28 Total Cash flows \$84 \$85 \$86 \$87 \$87 \$88 \$89 \$90 \$91 \$908

29

30 Interest Cost \$14 \$28 \$26 \$22 \$18 \$14 \$10 \$6 \$2 \$0

31

32 Net CF Available for Debt Repayment \$70 \$57 \$60 \$65 \$70 \$74 \$79 \$84 \$89 \$908

33 Debt Repayment \$0 \$0 \$46 \$46 \$46 \$46 \$46 \$46 \$46 \$0

34

35 Annual Net CF for Equity Returns (\$325) \$70 \$57 \$14 \$18 \$23 \$28 \$33 \$38 \$43 \$908

36

37 IRR to Equity 19%

38 NPV Per Subscriber

39 w/Discount Rate= 21% (\$31)

40

41 Debt Repayment/Interest

42	Year-->										
43	0	1	2	3	4	5	6	7	8	9	10
44											
45 Debt as % Investment=	50%										
46 Annual Investment (\$)	650	0	0	0	0	0	0	0	0	0	0
47 New Debt (\$/year)	325	0	0	0	0	0	0	0	0	0	0
48 New Debt (cum)	325	325	325	325	325	325	325	325	325	325	325
49											
50 DEBT REPAYMENTS											
51 New Debt											
52 new in year 1	0	0	46	46	46	46	46	46	46	46	0
53 new in year 2		0	0	0	0	0	0	0	0	0	0
54 new in year 3			0	0	0	0	0	0	0	0	0
55 new in year 4				0	0	0	0	0	0	0	0
56 new in year 5					0	0	0	0	0	0	0
57 new in year 6						0	0	0	0	0	0
58 new in year 7							0	0	0	0	0
59 new in year 8								0	0	0	0
60 new in year 9									0	0	0
61 new in year 10										0	0
62 new in year 11											0
63 new in year 12											
64 new in year 13											
65 new in year 14											
66 new in year 15											
67											
68											
69 DEBT REPAYMENT (\$/yr)	0	0	46	46	46	46	46	46	46	46	0
70 DEBT REPAYMENT (\$ cum)	0	0	46	93	139	186	232	279	325	325	325
71											
72 PRINCIPAL OUTSTANDING(eoy)	325	325	279	232	186	139	93	46	0	0	0
73 INTEREST (\$/Year)	14	28	26	22	18	14	10	6	2	0	0
74											
75											
76											
77											

41 Debt Repayment/Interest

42	Year-->										
43	0	1	2	3	4	5	6	7	8	9	10
44											
45 Debt as % Investment=	50%										
46 Annual Investment (\$)	875	0	0	0	0	0	0	0	0	0	0
47 New Debt (\$/year)	438	0	0	0	0	0	0	0	0	0	0
48 New Debt (cum)	438	438	438	438	438	438	438	438	438	438	438
49											
50 DEBT REPAYMENTS											
51 New Debt											
52 new in year 1	0	0	63	63	63	63	63	63	63	63	0
53 new in year 2		0	0	0	0	0	0	0	0	0	0
54 new in year 3			0	0	0	0	0	0	0	0	0
55 new in year 4				0	0	0	0	0	0	0	0
56 new in year 5					0	0	0	0	0	0	0
57 new in year 6						0	0	0	0	0	0
58 new in year 7							0	0	0	0	0
59 new in year 8								0	0	0	0
60 new in year 9									0	0	0
61 new in year 10										0	0
62 new in year 11											
63 new in year 12											
64 new in year 13											
65 new in year 14											
66 new in year 15											
67											
68											
69 DEBT REPAYMENT (\$/yr)	0	0	63	63	63	63	63	63	63	63	0
70 DEBT REPAYMENT (\$ cum)	0	0	63	125	188	250	313	375	438	438	438
71											
72 PRINCIPAL OUTSTANDING(\$oy)	438	438	375	313	250	188	125	63	0	0	0
73 INTEREST (\$/Year)	19	37	35	29	24	19	13	8	3	0	0
74											
75											
76											
77											

1 Cable Financial Returns: Competitive Systems

2

3 Financial Assumptions

4 Interest Rate

8.50% FCC Rpt& Order, Docket 93-215, 30Mar94, p102

5 Debt Leverage on Capital Investment

50% FCC Rpt& Order, Docket 93-215, 30Mar94, p106-108

6 Debt Repayment

7 Startling Year

3

8 Term

9

9 Overall Rate of Return (AfterTax)

11.25% FCC Rpt& Order, Docket 93-215, 30Mar94, p108

10 After Tax Return to Equity

14% Derived as In FCC Rpt& Order, Docket 93-215, 30Mar94, p108: Eq.Ret=(Avg Return-(%Debt*Debt Cost))/%Equity

11 Plus Allowed Return for Tax @ Rate: 34%

7.21% Gross up as In FCC Rpt& Order, Docket 93-215, 30Mar94, p83. Formula: Gross up = ((Tax rate/(1-Tax Rate))* Rate of return

12 Equity Rate of Return (PreTax)

21.21%

13 Terminal Multiple of Cash Flow

9 CF Multiple = 1/Rate of Return

14

15

16

17 Cable Franchise

ADL Code

18 Initial Capital Expenditure per Subscriber

\$545 QQ151

19 Annual Capital per Subscriber

\$0 Assumed

20 Revenue per Subscriber

\$188 QQ151

21 Expenses per Subscriber

\$132 QQ151

22 Cash Flow per Subscriber

\$56 QQ151

23 Cash Flow growth assumption (per Yr)

1% Real growth - assumed

24

25 Financial Performance

Year-->

1

2

3

4

5

6

7

8

9

10

26 Annual cash flows

\$56

\$57

\$57

\$58

\$58

\$59

\$59

\$60

\$61

\$61

27 Plus Terminal Cash

\$56

\$57

\$57

\$58

\$58

\$59

\$59

\$60

\$61

\$606

28 Total Cash flows

29

30 Interest Cost

\$12

\$23

\$22

\$18

\$15

\$12

\$8

\$5

\$2

\$0

31

32 Net CF Available for Debt Repayment

\$44

\$33

\$36

\$39

\$43

\$47

\$51

\$55

\$59

\$606

33 Debt Repayment

\$0

\$0

\$39

\$39

\$39

\$39

\$39

\$39

\$39

\$0

34

35 Annual Net CF for Equity Returns

(\$273)

\$44

\$33

(\$3)

\$1

\$4

\$8

\$12

\$16

\$20

\$606

36

37 IRR to Equity

13%

38 NPV Per Subscriber

39 w/Discount Rate= 21%

(\$92)

40

41 Debt Repayment/Interest

42	Year-->										
43	0	1	2	3	4	5	6	7	8	9	10
44											
45 Debt as % Investment=	50%										
46 Annual Investment (\$)	545	0	0	0	0	0	0	0	0	0	0
47 New Debt (\$/year)	273	0	0	0	0	0	0	0	0	0	0
48 New Debt (cum)	273	273	273	273	273	273	273	273	273	273	273
49											
50 DEBT REPAYMENTS											
51 New Debt											
52 new in year 1	0		39	39	39	39	39	39	39	39	0
53 new in year 2		0	0	0	0	0	0	0	0	0	0
54 new in year 3			0	0	0	0	0	0	0	0	0
55 new in year 4				0	0	0	0	0	0	0	0
56 new in year 5					0	0	0	0	0	0	0
57 new in year 6						0	0	0	0	0	0
58 new in year 7							0	0	0	0	0
59 new in year 8								0	0	0	0
60 new in year 9									0	0	0
61 new in year 10										0	0
62 new in year 11											0
63 new in year 12											
64 new in year 13											
65 new in year 14											
66 new in year 15											
67											
68											
69 DEBT REPAYMENT (\$/yr)	0	0	39	39	39	39	39	39	39	39	0
70 DEBT REPAYMENT (\$ cum)	0	0	39	78	117	156	195	234	273	273	273
71											
72 PRINCIPAL OUTSTANDING(eoy)	273	273	234	195	156	117	78	39	0	0	0
73 INTEREST (\$/Year)	12	23	22	18	15	12	8	5	2	0	0
74											
75											
76											
77											

1 Cable Financial Returns: Competitive Systems

2

3 Financial Assumptions

4 Interest Rate 8.50% FCC Rpt& Order, Docket 93-215, 30Mar94, p102

5 Debt Leverage on Capital Investment 50% FCC Rpt& Order, Docket 93-215, 30Mar94, p106-108

6 Debt Repayment

7 Starting Year 3

8 Term 9

9 Overall Rate of Return (AfterTax) 11.25% FCC Rpt& Order, Docket 93-215, 30Mar94, p108

10 After Tax Return to Equity 14% Derived as In FCC Rpt& Order, Docket 93-215, 30Mar94, p108: $Eq.Ret = (Avg Return - (\%Debt * Debt Cost)) / \%Equity$ 11 Plus Allowed Return for Tax @ Rate: 34% 7.21% Gross up as In FCC Rpt& Order, Docket 93-215, 30Mar94, p83. Formula: $Gross up = ((Tax rate / (1 - Tax Rate))) * Rate of return$

12 Equity Rate of Return (PreTax) 21.21%

13 Terminal Multiple of Cash Flow 9 CF Multiple = 1/Rate of Return

14

15

16

17 Cable Franchise**ADL Code**

18 Initial Capital Expenditure per Subscriber

\$1,072 QQ135

19 Annual Capital per Subscriber

\$0 Assumed

20 Revenue per Subscriber

\$333 QQ135

21 Expenses per Subscriber

\$227 QQ135

22 Cash Flow per Subscriber

\$106 QQ135

23 Cash Flow growth assumption (per Yr)

1% Real growth - assumed

24

25 Financial Performance

Year-->

26 Annual cash flows

1	2	3	4	5	6	7	8	9	10
\$106	\$107	\$108	\$109	\$110	\$111	\$113	\$114	\$115	\$116

27 Plus Terminal Cash

									\$1,030
--	--	--	--	--	--	--	--	--	---------

28 Total Cash flows

\$106	\$107	\$108	\$109	\$110	\$111	\$113	\$114	\$115	\$1,146
-------	-------	-------	-------	-------	-------	-------	-------	-------	---------

29

30 Interest Cost

\$23	\$46	\$42	\$36	\$29	\$23	\$16	\$10	\$3	\$0
------	------	------	------	------	------	------	------	-----	-----

31

32 Net CF Available for Debt Repayment

\$83	\$62	\$66	\$73	\$81	\$89	\$96	\$104	\$112	\$1,146
------	------	------	------	------	------	------	-------	-------	---------

33 Debt Repayment

\$0	\$0	\$77	\$77	\$77	\$77	\$77	\$77	\$77	\$0
-----	-----	------	------	------	------	------	------	------	-----

34

35 Annual Net CF for Equity Returns

(\$536)	\$83	\$62	(\$11)	(\$3)	\$4	\$12	\$20	\$27	\$35
---------	------	------	--------	-------	-----	------	------	------	------

36

37 IRR to Equity

12%

38 NPV Per Subscriber

39 w/Discount Rate= 21% (\$200)

40

41 Debt Repayment/Interes:

42	Year-->										
43	0	1	2	3	4	5	6	7	8	9	10
44											
45 Debt as % Investment=	50%										
46 Annual Investment (\$)	1,072	0	0	0	0	0	0	0	0	0	0
47 New Debt (\$/year)	536	0	0	0	0	0	0	0	0	0	0
48 New Debt (cum)	536	536	536	536	536	536	536	536	536	536	536
49											
50 DEBT REPAYMENTS											
51 New Debt											
52 new in year 1	0		77	77	77	77	77	77	77	77	0
53 new in year 2		0	0	0	0	0	0	0	0	0	0
54 new in year 3			0	0	0	0	0	0	0	0	0
55 new in year 4				0	0	0	0	0	0	0	0
56 new in year 5					0	0	0	0	0	0	0
57 new in year 6						0	0	0	0	0	0
58 new in year 7							0	0	0	0	0
59 new in year 8								0	0	0	0
60 new in year 9									0	0	0
61 new in year 10										0	0
62 new in year 11											0
63 new in year 12											
64 new in year 13											
65 new in year 14											
66 new in year 15											
67											
68											
69 DEBT REPAYMENT (\$/yr)	0	0	77	77	77	77	77	77	77	77	0
70 DEBT REPAYMENT (\$ cum)	0	0	77	153	230	306	383	459	536	536	536
71											
72 PRINCIPAL OUTSTANDING(90y)	536	536	459	383	306	230	153	77	0	0	0
73 INTEREST (\$/Year)	23	46	42	36	29	23	16	10	3	0	0
74											
75											
76											
77											

1 Cable Financial Returns: Competitive Systems

2

3 Financial Assumptions

4 Interest Rate 8.50% FCC Rpt& Order, Docket 93-215, 30Mar94, p102

5 Debt Leverage on Capital Investment 50% FCC Rpt& Order, Docket 93-215, 30Mar94, p106-108

6 Debt Repayment

7 Starting Year 3

8 Term 9

9 Overall Rate of Return (AfterTax) 11.25% FCC Rpt& Order, Docket 93-215, 30Mar94, p108

10 After Tax Return to Equity 14% Derived as In FCC Rpt& Order, Docket 93-215, 30Mar94, p108: $Eq.Ret = (Avg\ Return - (\%Debt * Debt\ Cost)) / \%Equity$ 11 Plus Allowed Return for Tax @ Rate- 34% 7.21% Gross up as In FCC Rpt& Order, Docket 93-215, 30Mar94, p83. Formula: Gross up = $((Tax\ rate / (1 - Tax\ Rate))) * Rate\ of\ return$

12 Equity Rate of Return (PreTax) 21.21%

13 Terminal Multiple of Cash Flow 9 CF Multiple = 1/Rate of Return

14

15

16

17 Cable Franchise

ADL Code

18 Initial Capital Expenditure per Subscriber

\$812 QQ147

19 Annual Capital per Subscriber

\$0 Assumed

20 Revenue per Subscriber

\$348 QQ147

21 Expenses per Subscriber

\$228 QQ147

22 Cash Flow per Subscriber

\$120 QQ147

23 Cash Flow growth assumption (per Yr)

1% Real growth - assumed

24

25 Financial Performance

Year-->

26 Annual cash flows \$120 \$121 \$122 \$124 \$125 \$126 \$127 \$129 \$130 \$131

27 Plus Terminal Cash \$120 \$121 \$122 \$124 \$125 \$126 \$127 \$129 \$130 \$1,167

28 Total Cash flows \$120 \$121 \$122 \$124 \$125 \$126 \$127 \$129 \$130 \$1,298

29

30 Interest Cost \$17 \$35 \$32 \$27 \$22 \$17 \$12 \$7 \$2 \$0

31

32 Net CF Available for Debt Repayment \$103 \$87 \$90 \$97 \$103 \$109 \$115 \$121 \$127 \$1,298

33 Debt Repayment \$0 \$0 \$58 \$58 \$58 \$58 \$58 \$58 \$58 \$0

34

35 Annual Net CF for Equity Returns (\$406) \$103 \$87 \$32 \$39 \$45 \$51 \$57 \$63 \$69 \$1,298

36

37 IRR to Equity 23%

38 NPV Per Subscriber

39 w/Discount Rate= 21% \$31

40

41 Debt Repayment/Interest

42	Year-->										
43	0	1	2	3	4	5	6	7	8	9	10
44											
45 Debt as % Investment=	50%										
46 Annual Investment (\$)	812	0	0	0	0	0	0	0	0	0	0
47 New Debt (\$/year)	406	0	0	0	0	0	0	0	0	0	0
48 New Debt (cum)	406	406	406	406	406	406	406	406	406	406	406
49											
50 DEBT REPAYMENTS											
51 New Debt											
52 new in year 1	0	0	58	58	58	58	58	58	58	58	0
53 new in year 2		0	0	0	0	0	0	0	0	0	0
54 new in year 3			0	0	0	0	0	0	0	0	0
55 new in year 4				0	0	0	0	0	0	0	0
56 new in year 5					0	0	0	0	0	0	0
57 new in year 6						0	0	0	0	0	0
58 new in year 7							0	0	0	0	0
59 new in year 8								0	0	0	0
60 new in year 9									0	0	0
61 new in year 10										0	0
62 new in year 11											0
63 new in year 12											
64 new in year 13											
65 new in year 14											
66 new in year 15											
67											
68											
69 DEBT REPAYMENT (\$/yr)	0	0	58	58	58	58	58	58	58	58	0
70 DEBT REPAYMENT (\$ cum)	0	0	58	116	174	232	290	348	406	406	406
71											
72 PRINCIPAL OUTSTANDING(eoy)	406	406	348	290	232	174	116	58	0	0	0
73 INTEREST (\$/year)	17	35	32	27	22	17	12	7	2	0	0
74											
75											
76											
77											

Appendix 4
Credentials of Arthur D. Little, Inc.

Appendix 4. Credentials of Arthur D. Little, Inc.

Arthur D. Little is an international management and technology consulting firm based in Cambridge, Massachusetts, which helps corporations, institutions and governments meet the challenges of today's complex and rapidly evolving marketplace. The firm offers consulting services in three distinct but complementary areas: management consulting, technology and product development, and environment, health and safety consulting. Arthur D. Little employs some 2400 staff members in 36 offices and laboratories worldwide.

Principal contributors to Arthur D. Little's assignment to evaluate FCC methodology for the Commission's 1994 rate order are:

- Dr. Peter D. Shapiro, Project Director
- Dr. Thomas E. Doerfler

Dr. Peter D. Shapiro

Dr. Shapiro, Senior Consultant in cable and telecommunications at Arthur D. Little, advises cable TV operators, telecommunications carriers, equipment and service vendors, financial institutions and government agencies, in the United States and in many other countries.

He has directed numerous assignments on marketing strategy, market entry options, and opportunities emerging with changes in the cable and telecommunications industries.

For example, Dr. Shapiro directed valuations of cable TV intangible assets, for major cable MSOs involved in landmark tax litigation. He helped a new venture to explore video-on-demand programming options and competitive environment. He provided an analytical basis for development of cable market entry strategy, including financial modeling of different cable system scenarios, for a telephone company in Latin America. He also structured a proposal for multichannel premium TV services for an license applicant in Malaysia.

For an equipment supplier, he directed an assessment of cable TV and broadband markets for fiber optic systems; he was a key contributor to multiyear assignments for Cable Television Laboratories on fiber optics applications in cable and on opportunities in Personal Communications Services (PCS).

Dr. Shapiro assisted Governments in Hong Kong and in Malta to evaluate their cable TV options. He was the principal author of a report on prospects for the cable industry that was presented at the opening session of the 1985 annual convention of the National Cable TV Association.

Dr. Shapiro has directed assignments involving telecommunications areas such as:

- Alternative local access
- Private switched network services
- Satellite services and markets
- Network management systems
- Demand for capacity in long-haul fiber optic networks
- Local access charge system

Dr. Shapiro's international experience includes assignments in Australia, China, Egypt, Hong Kong, Hungary, Malta, New Zealand, Papua New Guinea, Malaysia, the Philippines, Singapore, Thailand, Mexico, and Venezuela.

Prior to joining Arthur D. Little, Dr. Shapiro was Research Fellow in the Harvard University Program on Information Technologies and Public Policy. Earlier, at Stanford University, his doctoral thesis explored development of embryonic (1971-era) cable TV program distributing networks.

He has published in business, trade and academic journals, and has spoken at many industry conferences. A survey of U.S. information industries, which he co-authored, appeared as a feature article in a yearbook (1975) of the *Encyclopedia Britannica* and his article on relationships between industrial development and telecommunications appeared in *IEEE Transactions on Communications*.

Dr. Shapiro received his Ph.D. in Communications Research from Stanford University, and his B.A. from the University of British Columbia in Vancouver.

Dr. Thomas E. Doerfler

Dr. Doerfler is Senior Consultant in statistical analysis at Arthur D. Little, with over 25 years' experience consulting to a wide variety of private clients and U.S. Government agencies. His areas of specialized experience include:

- Multivariate Data Analysis
- Experimental Design
- Survey Sampling
- Applied Life Data Analysis
- Forensic Statistics

In addition to active participation in a diversity of client assignments, Dr. Doerfler is responsible for managing, directing, and training other professional staff members in the application of statistical methods. He has frequently been involved in challenging assignments requiring innovative approaches to the design and analysis of complex sample surveys and statistical experiments. Some of his recent analytical contributions have been subjected to intensive review and criticism by academicians and attorneys representing both client and adversarial viewpoints.

In a major assignment for attorneys representing TeleCommunications Inc. (TCI), Dr. Doerfler submitted expert testimony in a December 1989 Federal Tax Court hearing in Washington, DC. Litigation concerned the valuation of intangible assets associated with acquisition of cable television systems. Dr. Doerfler was responsible for determining the remaining useful life of cable subscribers, and characterized the service disconnect process through the application of modern statistical life data analysis methods.

Other assignments have included:

- Regional telephone company, 1987. As statistical consultant, Dr. Doerfler designed and analyzed a complex experiment to determine key customer requirements for advanced telecommunications services. The determination of teleservice features required a flexible and innovative application of a marketing technique known as Conjoint Analysis.
- A State Lottery Commission, 1985-1990. As a statistical consultant, he has been responsible for assisting the Commission in maintaining the integrity of various lottery offerings to the public. He has proposed routine testing of devices and equipment used to generate random numbers and has been consulted on a variety of statistical issues in this capacity.
- Trustmark Corporation v. Commissioner of Internal Revenue, Docket No. 18372-89, June 1991. Engaged by the law firm of Alston & Bird to present expert testimony regarding the estimation of useful life of intangible assets in connection with the acquisition of a bank located in Canton, Mississippi; Dr. Doerfler's testimony on statistical methods became the focal point of the trial, and his submission to the court was required to withstand vigorous attack by three expert statisticians representing the Commissioner.
- Peoples Bancorporation, Petitioner, Docket No. 29058-89, October, 1990. Appeared as an expert witness in U.S. Tax Court litigation involving acquisition of two bank branches located in North Carolina; determined the remaining useful life of both Regular Savings Accounts and Demand Deposit Accounts existing at the time of acquisition.

- Ithaca Industries, Inc., Petitioner, Docket No. 7076-89, April, 1990. In a U.S. Tax Court trial in Atlanta, Dr. Doerfler presented both oral and written testimony in which he justified the determination of the remaining useful life of the assembled work force acquired by the petitioner in October 1983. His estimates, based on well-established and rigorous probability theory, were shown to be accurate when compared to actual employee terminations over the subsequent six year period following the acquisition.
- The Citizens and Southern Georgia Corp., 1986-1987. As project statistician, he analyzed the mortality patterns exhibited by customer accounts for the purpose of determining the useful life of assets subject to amortization. His approach, although routinely used in engineering, bio-medical, and actuarial applications, has been regarded as imaginative and unique in the context of property valuation, where less rigorous estimation methods had been used for approximately 50 years. He presented his statistical methodology and results in the form of expert testimony at a Federal Tax Court hearing in late 1987. See Citizens & Southern Corp. and Subs. v. Commissioner, 91 T.C. 463 (1988), app'd per curiam in an unpublished opinion (11th. Cir., March 22, 1990).
- Burke, Wieners, Moran, Hurley and Merrick, 1983-1987. Dr. Doerfler served as expert witness representing the insurer in a large and complex business interruption claim. Opponents included quantitative analysts from two prominent accounting firms, both of whom used inappropriate methods to quantify damages.
- Beatrice Companies, 1983-1984. As project statistician, he performed statistical sampling and analytical tasks in support of the overall valuation of each of several tax entities involved in the acquisition of a number of soft drink, bottled water, and industrial water companies. His work was subjected to intensive criticism by a review team, comprised of four prominent academicians, that was assembled by the client at the recommendation of the Arthur D. Little case team.

Dr. Doerfler is a member of the American Statistical Association, Boston Chapter, and the American Society for Quality Control. He has taught statistics and mathematics at both undergraduate and graduate levels, most recently at the Boston University Graduate School of Business Administration.

Before joining Arthur D. Little, he held positions with Booz-Allen, and CBS, Inc., where he served as Director of Management Sciences.

Dr. Doerfler received his Ph.D., Statistics, from Iowa State University, in 1965; his M.S., Statistics, from Iowa State University, in 1962; and his B.S., Mathematics, from University of Dayton, in 1959.

Other Significant Contributors

Other significant contributors to this assignment include:

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- David Kluchman
- Stuart J. Lipoff

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Ms. Borglum is a statistician whose principal focus at Arthur D. Little has been management, statistical analysis, and interpretation of large and very complex databases. Her M.S. in Statistics is from University of Vermont, 1987.

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Mr. Kluchman is Consultant at Arthur D. Little in the Telecommunications Information Media and Entertainment unit. He focuses on financial analysis, modeling and valuations for companies in a broad range of industries, most recently in connection with a product launch for a major paging service. His master's degree was earned at the Yale School of Organization and Management.

Stuart J. Lipoff

Mr. Lipoff is Vice President and Director in the Technology and Product Development Directorate at Arthur D. Little. He is a communications systems engineer with a national reputation in a wide variety of communications and information technologies. Mr. Lipoff led Arthur D. Little's major assignments for Cable Television Laboratories. A Registered Professional Engineer (by examination) in the Commonwealth of Massachusetts, Mr. Lipoff holds Master's degrees in Electrical Engineering from Northeastern University and in Business Administration from Suffolk University. Mr. Lipoff has undertaken leadership responsibilities such as IEEE; he has published in numerous professional journals; and he speaks frequently at professional and industry conferences.

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**Evaluation of FCC
Methodology for
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**Volume 2
Output of Statistical
Analyses**

**Report to National Cable
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June 1994

**Arthur D. Little, Inc.
Acorn Park
Cambridge, Massachusetts
02140-2390**

Reference 46535

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1-A	Summary Statistics
1-B	Logistic Regression
1-C	Cluster Analysis
1-D	Analysis of Variance
1-E	Weighted Regression
1-F	FCC Regression Diagnostics

Attachment 1-A
Summary Statistics

A1	System Size								Total			
	Small				Large							
	N	Average	Std. Dev	Sum	N	Average	Std. Dev	Sum	N	Average	Std. Dev	Sum
Competition Type												
Non-Competitive	207	0.36	0.48	75.00	163	0.36	0.48	58.00	370	0.36	0.48	133.00
Competitive	29	0.34	0.48	10.00	21	0.24	0.44	5.00	50	0.30	0.46	15.00
Total	236	0.36	0.48	85.00	184	0.34	0.48	63.00	420	0.35	0.48	148.00

Univariate Procedure

Variable=A1

Moments				Quantiles(Def=5)				Extremes			
N	420	Sum Wgts	420	100% Max	1	99%	1	Lowest	Obs	Highest	Obs
Mean	0.352381	Sum	148	75% Q3	1	95%	1	0(	404)	1(	416)
Std Dev	0.478282	Variance	0.228753	50% Med	0	90%	1	0(	403)	1(	417)
Skewness	0.620243	Kurtosis	-1.62305	25% Q1	0	10%	0	0(	402)	1(	418)
USS	148	CSS	95.84762	0% Min	0	5%	0	0(	401)	1(	419)
CV	135.7286	Std Mean	0.023338			1%	0	0(	400)	1(	420)
T:Mean=0	15.09918	Prob>|T|	0.0001	Range	1						
Num += 0	148	Num > 0	148	Q3-Q1	1						
M(Sign)	74	Prob>|M|	0.0001	Mode	0						
Sgn Rank	5513	Prob>|S|	0.0001								
W:Normal	0.58365	Prob<W	0.0001								

